



SEQUENCE LISTING

<110> Gopalan, Venkat
Jovanovic, Milan
Eder, Paul S.
Giordano, Tony
Powers, Gordon D.
Xavier, K. Asish

<120> Novel Bacterial RNase P Proteins and
Their Use in Identifying Antibacterial Compounds

<130> 50093/016001

<140> US 09/516,061
<141> 2000-03-01

<160> 98

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 417
<212> DNA
<213> Streptococcus mutans

<400> 1
agatttttgg ctttttctca ttttatgata taatagtgtat aatttaaataa ttggagtcat 60
gttttggaaaa aaggcctatcg cgttaaaagt gataaaagatt ttcaggcaat ttttactgaa 120
ggacgaagtg ttgccaatcg gaaatttgggt gtctatagtt tagaaaaaaga tcaaagtac 180
tatcgtgttg gactttcaagt tgaaaaaaaga ttaggaaatg ctgtcgtagg aaatgcgatt 240
aaacgaaaaat tgcgccatgt ccttatggaa ctggccctt atttaggcac tcaagatttt 300
gttggatttg ctagaaaagg tggtaggaa cttgattata gcacgatgaa aaaaaatctg 360
gttcatgttt taaaactggc taaaactgtat caggaaggat ctattcgtga aaaagaa 417

<210> 2
<211> 477
<212> DNA
<213> Klebsiella pneumoniae

<400> 2
cgtcgtcgtg ctaaaggccg cgctcgtctg accgtttcca agtaataaaag ctaaccctgc 60
gtgggtaagc tcgcatttcc cagggaggtt cgcttggtaa ctcccagtca tttcacttcc 120
gtcttccagc agccacaacg ggctggcacg ccgcataatca ccattcctcg ccgcctgaaat 180
tcgcgtgggc atccccgcatt cggctcacc gtcgcacaaga aaaacgtgaa acgcgcacat 240
gaacgcaatc ggattaaacg tctgacgcgt gaaagtttc gtttgcgtca acatgaactc 300
ccgccaatgg atttcgtgggt ggtggcgaaa agaggggtt ccgacctcgta taaccgtgct 360
ctctcggaag cgttggaaaa attatggcgc cggccatgtc gcctggctcg cgggtccctga 420
tcggccctgat tcgagtttat cagcgcctga ttagtccgct actcggcccg cattgtc 477

<210> 3
<211> 455
<212> DNA
<213> Salmonella paratyphi

<400> 3

ctgaccgttt ccaagtaata aagctaaccc ctgagtggtt aagctcgcat ttcccaggga 60
 gttacgtttg ttaactcccg ctcatttcac attcgcttcc cagcaacctc aacgggctgc 120
 acgcccacaa tcaccatccct cggccgcctg aattcgctgg ggcatacccg tatcggtctt 180
 accgtcgcca agaaaaatgt tcgacgtgcg catgaacgca accggattaa acgtctgacg 240
 cgtgaaagct tccgtctgcg ccagcatgaa cttcctgcaa tggatttcgt ggtggggcg 300
 aaaaaagggg ttgccgaccc cgataaccgt gctctcgg aagcgttggaaaattatgg 360
 cggcccaact gtcgcctggc tcgcgggtcc tgatagccct tattcgggtc tatcaacgcc 420
 tgatcagtcc gctgcttggg ccgcattgtc gtttc 455

<210> 4

<211> 528

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 4

tctgtcgctg cgtcgccca aaggccgtaa gcgtctgacc gtctgattta tccggtacgg 60
 gtggtgagtc gggacttcga cgggacaag cgtctactga cagcccggca attcagcgca 120
 gtcttcgact ctccgacccg caaggtcccc ggcaagcacg tcctgctgcg ggcgcgcgag 180
 aacggtctcg atcaccctcg cctggcctg gtgatcggca agaagaacgt caagctcgcc 240
 gtccagcgca atcgccctcaa acgcctgatc cgcgaatcgt tccggccataa ccagggaaacc 300
 ctggctggct gggatatcgt ggtgatcgcg cgcggacttggcgaact ggaaaatccg 360
 gagctgcacc agcagttcgg caagctctgg aaacgcctgt tgccgaatcg acctcgacg 420
 gaaagccctg ctgacgcccc tggcgtggcc gacggtaactc atgcataatgg cgatgcccgc 480
 gcatcccgat ccctgttagtgc tcatcccccc ttcatgtgacc cggcaccg 528

<210> 5

<211> 510

<212> DNA

<213> *Corynebacterium diphtheriae*

<400> 5

ccggtcgcgc aatcggtggc gcacgtcgta acaagggtcg taagagcctg accgcttaag 60
 gtcactctta caagctcgaa tagaacgcacg gtgctaccc tacagcacaa gtcagcaat 120
 tccgaacagt tccgcgaac gattcggaaag ggcaagcgtg ctgggaggag caccgtcg 180
 cttcattttt atgctgaggc gaccgcggc aaccttgc aa ccgcaggcgg cccgcgattc 240
 ggcctcggtg tgtccaaaggc tggatggaaat gctgtgactc gtcaccgtgt ttgcggcag 300
 ttaaggcactc tagtaatcgc tatgaaagac cagttccag cgtcatccca tggatggatgt 360
 agggcgatac cgccagcggc gacagcaagt tatgaggagt tgccggcaga tgtcaggca 420
 gcactcgaca agctcaaccg caagcgataa ggcgttact cgcctcgat ggctggtag 480
 tcgcgcattt tttatgtgcgg tgcgggttctt 510

<210> 6

<211> 504

<212> DNA

<213> *Chlamydia trachomatis*

<400> 6

gctacaaaaaa gtggaaagaaa tcttttaat cgtcgctgccc gtcacggcag acattcctta 60
 attgatctt aagatcttc atttgcattt cggtaactc tacctaaaag tgccgccta 120
 ttgaaacgtt aacaatttgc ttacgtgcag ctttgcggc aatattgtcg tactgatcag 180
 gcaactttac gaatagtcc ttctcgatc tcgaacatcc gtaaaggtagg gttactgtt 240
 tctaaaaat ttggaaagc ccatcagcgc aatcgctta aaagaattgt gcgagaggct 300
 ttttaggcattt tgcgacccaa tctcccgca tgtcaagtgg tagtgcctcc taaagggggc 360
 actctacca aatttggtaa actatccgcg gatcttcttta agcatattcc agaggctttg 420
 cctctcgatc cttcttcttta gtagttttt atttggatc aaaaataaaaaa aaccattccca 480

cgctatagag gcatggaatg ggaa

504

<210> 7
<211> 492
<212> DNA
<213> Vib

<400> 7

ggcagcgtgg ggcgataaagt ggactaataa accactggta aagttttaca ataccaatgg 60
ctaacccacga gaaggggcgag agaggcggtt ccatagttt ccaagcaagt taaaacagttc 120
ttcattgctc aaatcttgcg cgctctttt ggcgatgaca acaaaaatctt tgtagccag 180
ttgattttga tgtaagcgaa agctttctct gcaaatacgt ttgaatcgat tacggccgac 240
ggcagtttg atctgctttt taggaaccgc gagtccccaaa cgaggatgag aaaggttatt 300
agcgcgagcg atgattgtga gatgaggaga accagcactg tgagcttgat ggaagacttt 360
ttgataatgt tcgggaggtt acaaacgtaa ctcccgattt aatgcgtacg tactcaaaat 420
aattcggagat tattttgaca ggcgcttacg gccttttgcg cgacgtgcatt tcagaacttt 480
acgaccgttc gc 492

<210> 8

<211> 492

<212> DNA

<213> *Neisseria gonorrhoea*

<400> 8

atgttccttg tatggaaac ccgttgcgt ctgaacctg cctgcagggt accgttctga 60
tcataacctgt ttcccgcatc cggttgcgg gttgccgaac atgagttgtg ccagttccgc 120
ccttgcctgt tttgcgttag ccctgtcga tttccggcgg acgcgcacga cgaatcctg 180
aggcggcagc cgggtttgt tcaatctgaa ccagtcgcgg atgacgcgtt tcatatagtt 240
ccgctcgttg ggcgtttgg cgggtttttt ggcgaccacc agaccgatgc ggggatggtc 300
cagcccgttg cgcgttggc gcgaaacttg cagcaggtcg cggctgcggc gggttctgaa 360
tgcaaaaacg gatgaaaaat catccgttt taacaagcgg tactgccttc cgaagcggta 420
gtccaaaatt acactgccag gcgtttgcgg ctttggcac ggcgtgcggc caataactgcg 480
cqtcqccqccq qt 492

<210> 9

<211> 492

<212> DNA

<213> *Neisseria meningitidis*

<400> 9

tgttccttag tatggaaac ccgttgcgt ctgaaccttgcctgcagagt accgttctga 60
tcatgcctgt ttcctgcata cggttgcggg gttgcgaac atgagttgtgcagttccgc 120
ccttcctgt tttgcgttag ccctgtcgaa tttacggcg acgcgcacga cgaatctg 180
cgccggcagc cggttttgc tcaatctgaa ccagtcgcgg atgacgcgt tcataatt 240
tcgttcgttg ggcgtttgg cggttttttgc ggcgaccacc agaccgatgc ggggatgatc 300
cagccgttg cgcgttgcac gcgaaacttgc cagcaggtcg cggctgcggc gtttctgaa 360
tgcaaaaacg gatgaaaaat catccgttttcaacaagcggtactgccttc cgaagcggt 420
gtccaaaatt acaccgcccag gcgtttgcgg ctttggcgc ggcgtgcggc caataactgcg 480
cgccggccqc qc 492

<210> 10

<211> 462

<212> DNA

<213> *Streptococcus pyogenes*

<400> 10

gttacacctac cacgaccaca ggccactaat aatagaacta aggggactat tcttgcaatt 60

ttaatgttt tttcaactct caaaaccttt ctcaagcaat tggctactt taaaacatg 120
atgtaaattt tggtaaactt ctgtatactc caaagattcg acacccttac gggcaatcac 180
cacgaaatcc tctgacttca gctgatgccc taatgcctat ataacatgac gtatcttcg 240
tttgcactca tttctggta ctgcatttcc tatttttttta ccgacagaaa taccacacg 300
gaagtggct tggcctctat taaaatgata aatgacaat ttcgattt ctgtacttt 360
tccatcctta aatatggctt ggaaatctt ctcacgctt acacgatagg tttcttcaa 420
aatttaactc caatatctaa attattacca ttataccaca tc 462

<210> 11
<211> 492
<212> DNA
<213> *Bordetella pertussis*

<400> 11
ccaccagg gctgaggaag taccggtaaa accggatcg ggcgataagc agtctcctga 60
tcatcgct atccgtgtga agtggatc tacttcggcg cgccgcgagc gtttcaggc 120
cgtgaggctt gccgggtca gcttgcgtg cagccgcacc acgttaatcct gggccggcag 180
ggcaagccgg cgagcccgga acgttcgcg gatgaccgc ttcaaggat tgcgcgtcac 240
ggcgccggcg gcaaaacgct tggcgatcac caggcccagg cgccgcgcg cccgctggc 300
atcagcaggg gcacaggcg aggcgctgac aataaaagaaa gccctcggg ccagtcgccc 360
gccttgagg gcccggcaa actcgaggg gcatgcaat cgccctccg cagggagcgt 420
ggcgccggc atgggtgacg tgacggagac tggcgacggg gcccggcg atgctcctgt 480
tacaggcaat cc 492

<210> 12
<211> 534
<212> DNA
<213> *Porphyromonas gingivalis*

<400> 12
agaagaaaaat ggggagcagt aagagttgca cgagaaaaagc cttgatcagt cgcatcgat 60
ttactcgttt ttcaaagccg atgaaggatc atttccggca attctgatca gactctttt 120
catcgcttc tccactgtac gaaagtcagg aagttcatcc gatactacca taaaatgcaat 180
agtagcatag atctgtctt cttggaggac atcggtcagg aggtgtttgt tgagccata 240
agcctccctg accaaacgct tgaccctatt gcgcttcacg gctcgctaa acctttctt 300
tgctacgctt accagcatgg aggaatatgc aactcgatgc tccgatccca gacggtagac 360
tacgcgtaga ggataaaacga caaaacgcctt gccttcgcca aagaccgtat tgatttcatc 420
gcgaagatag aggcgttcgc tttggatag gccgaatgta ggcggagagg tcattcccg 480
ttgaggtaat cctctaattgc catagccata gaaggatatt gctcggtcgg cgca 534

<210> 13
<211> 495
<212> DNA
<213> *Streptococcus pneumoniae*

<400> 13
tcgttagtta cccccattagc cgacacaggct gtcatgatta acagagacag tcctagcaaa 60
ctagtcaact ttagtttctt tttcaactccc atttccttcc cgtaaatct ttgataattt 120
taatacatgg agtagattt tctccatctc tgcgtatccc aaggttcga ctcctttcg 180
agcaatgaca acaaagtcga catttctac cagactccct ttgcattct ggataatatg 240
ccgaatccgt cgcttaattt gatttcttagt gacggcattc cccagtttt tgctaaactga 300
tagacctact cgaaaacggt tttctgggtt ttcttaattgg tagaccacaa atttgcgatt 360
agcaaaactt gtcccccttca taaaaatcgctttaaaatct ttctctttt ttacacgaaa 420
gttttcttc aaaactcaac tccatctatt aaattactac tattataccca tatttttcaa 480
aaaagccaat catag 495

<210> 14

<211> 465
 <212> DNA
 <213> Clostridium difficile

<400> 14
 tccttaata tataaattat tttattcaaa gtcattaacc tcacatattta tagcatacaa 60
 ttaaatagaa atatccgttc ttttaactaa atttttata gacttgtcta tgtcttaaa 120
 agtagcatcc ttactagata cccttgctat aaatactata tcataatccag gcttaatttt 180
 ttcatcaata tttaatctgt aggttcttt tattaatctt ctactctat tcctagtaat 240
 agctttcctt acttttttg aaacagaaaat acctactcta ctataatctg atttatttt 300
 aagtatataat attactaaat atttgttgc aaaagatttgc ccttgcgttat atactttct 360
 aaaatcagag tctttttca acccttttagt ctttgcgttat acctccataa 420
 acacagctat gaatcgtaat tatttacaca aaaaggccac ctttg 465

<210> 15
 <211> 447
 <212> DNA
 <213> Camphylobacter jejuni

<400> 15
 aagcagcggg ttttaaaggg cttaagaatt tctgataaaaa acggagtatt tttaggcata 60
 tcatttgaaa cattctagtt tttcaatcc ccattttaga ttttttcta acctagaaaa 120
 agaaagttca gtgatttcat ttttagctac aaaaatataat ttgccatctt gaagatatct 180
 ttcaaactta gcaaaacaaag ctctaaaat tcgtttgaa cgatttctaa ccactgcttt 240
 tccaaactttt ttactagcaa caactgctat tttttttca taactattca gataaaaaat 300
 gatcacaccc tcgcaatgcc atttttgcc tactttatatacagatgaaa attcctcggtt 360
 tgtgctaaat ttatcaaaat ttttcacaca gcaagtcttt ttctacctt agcgcgtttt 420
 gcattgatca ctttgcgacc attttta 447

<210> 16
 <211> 480
 <212> DNA
 <213> Baccillus anthracis

<400> 16
 taaaacctaatttca aagcctactc ctccttgcgtat cggtatgtat atagtgtaat 60
 tcatttcctt acgctactttt ttattctttt cataccagag cgtttaaaga catgaattaa 120
 gcttttctt aattcttcat atgtcatctc tgcacaaggc ttcccttgcata ttataacaaa 180
 atctttcca gaatctatct catctttaa ttctgtgatc gactggcgaa tcatacgttt 240
 aattcggta cgcactactg catttcctat cttcttgctg acagaaaggc caatacgaaaa 300
 gtttggctgc tcttctttat ctatgtgata gacaacaaat tgacgattcg cattcgattt 360
 tccttttga aaaaccgtct ggaattcatac attctttttt atacgatgtt ttttcttcat 420
 atcaattgac actcctgttag ttcatcagcg gaaattcact attattagaa aaaaagacca 480

<210> 17
 <211> 480
 <212> DNA
 <213> Mycobacterium avium

<400> 17
 gtccgcgggc gacgggttcgg ccggcgccgc gaatggccgc gcccgaccgc gccgggtccgg 60
 tcacggcccg gttcccgccg gcatgcgccc caggcaccgc tgcagttccct ggcgcaggcg 120
 cggcgcacgc gcggtccggc ttccgggcag cgcgcgaatc accagccggc cggatgggttc 180
 gagttcgccg agcagggccc gggccacgtg acgcagccgg cgggcccacgc ggtgtcggtt 240
 caccggccgtc cgcacggcct tcccgacgac cagcccggacc cgtggggcccg cggattcg 300
 gtcgggttcg gagtcgcgccc ggaggtggac gacgatgtcg ggctgcgcaca tgcgggttcc 360

gtgcttcacc gtcgcgtcaa actcggttga ccgcgtcatg cggttgcgtg cggaaagcac 420
cgcgaaagac ctgacgtgcg atcaggcaga gagcgcgcgg cgacccttgc ggcgccgacc 480

<210> 18
<211> 474
<212> DNA
<213> *Staphylococcus aureus*

<400> 18
gttataagct caatagaagt taaaatatag cttcaaataa aaacgataaa taagcgagt 60
atgttattgg aaaaagctta ccgaattaaa aagaatgcag atttcagag aatatataaa 120
aaaggtcatt ctgtagccaa cagacaattt gttgtataca ctgtataaa taaagaaata 180
gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaaagaaac 240
aagattaaaa gagcaatacg tgaaaatttc aaagtacata agtcgcataat attggccaaa 300
gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360
agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420
ggttagggaa ggaaaacatt aaccactcaa cacatcccga agtcttacct caga 474

<210> 19
<211> 474
<212> DNA
<213> *Staphylococcus aureus*

<400> 19
gttataagct caatagaagt taaaatatag cttcaaataa aaacgataaa taagcgagt 60
atgttattgg aaaaagctta ccgaattaaa aagaatgcag atttcagag aatatataaa 120
aaaggtcatt ctgtagccaa cagacaattt gttgtataca ctgtataaa taaagaaata 180
gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaaagaaac 240
aagattaaaa gagcaatacg tgaaaatttc aaagtacata agtcgcataat attggccaaa 300
gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360
agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420
ggttagggaa ggaaaacatt aaccactcaa cacatcccga agtcttacct caga 474

<210> 20
<211> 119
<212> PRT
<213> *Streptococcus mutans*

<400> 20
Val Leu Lys Lys Ala Tyr Arg Val Lys Ser Asp Lys Asp Phe Gln Ala
1 5 10 15
Ile Phe Thr Glu Gly Arg Ser Val Ala Asn Arg Lys Phe Val Val Tyr
20 25 30
Ser Leu Glu Lys Asp Gln Ser His Tyr Arg Val Gly Leu Ser Val Gly
35 40 45
Lys Arg Leu Gly Asn Ala Val Val Arg Asn Ala Ile Lys Arg Lys Leu
50 55 60
Arg His Val Leu Met Glu Leu Gly Pro Tyr Leu Gly Thr Gln Asp Phe
65 70 75 80
Val Val Ile Ala Arg Lys Gly Val Glu Glu Leu Asp Tyr Ser Thr Met
85 90 95
Lys Lys Asn Leu Val His Val Leu Lys Leu Ala Lys Leu Tyr Gln Glu
100 105 110
Gly Ser Ile Arg Glu Lys Glu
115

<210> 21
<211> 119
<212> PRT
<213> Klebsiella pneumoniae

<400> 21
Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ser
1 5 10 15
His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
20 25 30
Ile Thr Ile Leu Gly Arg Leu Asn Ser Leu Gly His Pro Arg Ile Gly
35 40 45
Leu Thr Val Ala Lys Lys Asn Val Lys Arg Ala His Glu Arg Asn Arg
50 55 60
Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu Arg Gln His Glu Leu
65 70 75 80
Pro Pro Met Asp Phe Val Val Ala Lys Arg Gly Val Ala Asp Leu
85 90 95
Asp Asn Arg Ala Leu Ser Glu Ala Leu Glu Lys Leu Trp Arg Arg His
100 105 110
Cys Arg Leu Ala Arg Gly Ser
115

<210> 22
<211> 110
<212> PRT
<213> Salmonella paratyphi

<400> 22
Val Thr Phe Val Asn Ser Arg Ser Phe His Ile Arg Leu Pro Ala Thr
1 5 10 15
Ser Thr Gly Cys Thr Pro Gln Ile Thr Ile Leu Gly Arg Leu Asn Ser
20 25 30
Leu Gly His Pro Arg Ile Gly Leu Thr Val Ala Lys Lys Asn Val Arg
35 40 45
Arg Ala His Glu Arg Asn Arg Ile Lys Arg Leu Thr Arg Glu Ser Phe
50 55 60
Arg Leu Arg Gln His Glu Leu Pro Ala Met Asp Phe Val Val Ala
65 70 75 80
Lys Lys Gly Val Ala Asp Leu Asp Asn Arg Ala Leu Ser Glu Ala Leu
85 90 95
Glu Lys Leu Trp Arg Arg His Cys Arg Leu Ala Arg Gly Ser
100 105 110

<210> 23
<211> 135
<212> PRT
<213> Pseudomonas aeruginosa

<400> 23
Val Val Ser Arg Asp Phe Asp Arg Asp Lys Arg Leu Leu Thr Ala Arg
1 5 10 15
Gln Phe Ser Ala Val Phe Asp Ser Pro Thr Gly Lys Val Pro Gly Lys
20 25 30

His	Val	Leu	Leu	Leu	Ala	Arg	Glu	Asn	Gly	Leu	Asp	His	Pro	Arg	Leu
35							40					45			
Gly	Leu	Val	Ile	Gly	Lys	Lys	Asn	Val	Lys	Leu	Ala	Val	Gln	Arg	Asn
50					55					60					
Arg	Leu	Lys	Arg	Leu	Ile	Arg	Glu	Ser	Phe	Arg	His	Asn	Gln	Glu	Thr
65					70				75			80			
Leu	Ala	Gly	Trp	Asp	Ile	Val	Val	Ile	Ala	Arg	Lys	Gly	Leu	Gly	Glu
					85				90			95			
Leu	Glu	Asn	Pro	Glu	Leu	His	Gln	Gln	Phe	Gly	Lys	Leu	Trp	Lys	Arg
					100				105			110			
Leu	Leu	Arg	Asn	Arg	Pro	Arg	Thr	Glu	Ser	Pro	Ala	Asp	Ala	Pro	Gly
					115				120			125			
Val	Ala	Asp	Gly	Thr	His	Ala									
					130				135						

<210> 24
 <211> 129
 <212> PRT
 <213> *Corynebacterium diphtheriae*

Val	Thr	Leu	Thr	Ser	Ser	Asn	Arg	Thr	Thr	Val	Leu	Pro	Ser	Gln	His
1						5			10			15			
Lys	Leu	Ser	Asn	Ser	Glu	Gln	Phe	Arg	Ala	Thr	Ile	Arg	Lys	Gly	Lys
						20			25			30			
Arg	Ala	Gly	Arg	Ser	Thr	Val	Val	Leu	His	Phe	Tyr	Ala	Glu	Ala	Thr
						35			40			45			
Ala	Gly	Asn	Leu	Ala	Thr	Ala	Gly	Gly	Pro	Arg	Phe	Gly	Leu	Val	Val
						50			55			60			
Ser	Lys	Ala	Val	Gly	Asn	Ala	Val	Thr	Arg	His	Arg	Val	Ser	Arg	Gln
						65			70			75			80
Leu	Arg	His	Val	Val	Ile	Ala	Met	Lys	Asp	Gln	Phe	Pro	Ala	Ser	Ser
						85			90			95			
His	Val	Val	Val	Arg	Ala	Ile	Pro	Pro	Ala	Ala	Thr	Ala	Ser	Tyr	Glu
						100			105			110			
Glu	Leu	Arg	Ala	Asp	Val	Gln	Ala	Ala	Leu	Asp	Lys	Leu	Asn	Arg	Lys
						115			120			125			
Arg															

<210> 25
 <211> 119
 <212> PRT
 <213> *Chlamydia trachomatis*

Val	His	Arg	Leu	Thr	Leu	Pro	Lys	Ser	Ala	Arg	Leu	Leu	Lys	Arg	Lys
1							5			10			15		
Gln	Phe	Val	Tyr	Val	Gln	Arg	Cys	Gly	Gln	Tyr	Cys	Arg	Thr	Asp	Gln
							20			25			30		
Ala	Thr	Leu	Arg	Ile	Val	Pro	Ser	Arg	His	Ser	Asn	Ile	Arg	Lys	Val
							35			40			45		
Gly	Val	Thr	Val	Ser	Lys	Lys	Phe	Gly	Lys	Ala	His	Gln	Arg	Asn	Arg
							50			55			60		
Phe	Lys	Arg	Ile	Val	Arg	Glu	Ala	Phe	Arg	His	Val	Arg	Pro	Asn	Leu

65	70	75	80
Pro Ala Cys Gln Val Val Val Ser Pro	Lys Gly Gly Thr Leu Pro Asn		
85	90	95	
Phe Gly Lys Leu Ser Ala Asp Leu Leu Lys His Ile Pro Glu Ala Leu			
100	105	110	
Pro Leu Val Thr Ser Ser Lys			
115			

<210> 26
 <211> 122
 <212> PRT
 <213> Vibrio cholerae

<400> 26			
Ser Arg Ile Ile Leu Ser Thr Tyr Ala Phe Asn Arg Glu Leu Arg Leu			
1	5	10	15
Leu Thr Pro Glu His Tyr Gln Lys Val Phe Gln Gln Ala His Ser Ala			
20	25	30	
Gly Ser Pro His Leu Thr Ile Ile Ala Arg Ala Asn Asn Leu Ser His			
35	40	45	
Pro Arg Leu Gly Leu Ala Val Pro Lys Lys Gln Ile Lys Thr Ala Val			
50	55	60	
Gly Arg Asn Arg Phe Lys Arg Ile Cys Arg Glu Ser Phe Arg Leu His			
65	70	75	80
Gln Asn Gln Leu Ala Asn Lys Asp Phe Val Val Ile Ala Lys Lys Ser			
85	90	95	
Ala Gln Asp Leu Ser Asn Glu Glu Leu Phe Asn Leu Leu Gly Lys Leu			
100	105	110	
Trp Gln Arg Leu Ser Arg Pro Ser Arg Gly			
115	120		

<210> 27
 <211> 123
 <212> PRT
 <213> Neisseria gonorrhoea

<400> 27			
Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr			
1	5	10	15
Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp			
20	25	30	
Leu Leu Gln Val Ser Arg Ser Asn Gly Asn Gly Leu Asp His Pro Arg			
35	40	45	
Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg			
50	55	60	
Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn			
65	70	75	80
Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp			
85	90	95	
Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe			
100	105	110	
Gly Asn Pro Ala Thr Gly Cys Gly Lys Gln Val			
115	120		

<210> 28
<211> 123
<212> PRT
<213> *Neisseria meningitidis*

<400> 28
Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr
1 5 10 15
Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp
20 25 30
Leu Leu Gln Val Ser Arg Ser Asn Gly Asn Gly Leu Asp His Pro Arg
35 40 45
Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg
50 55 60
Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn
65 70 75 80
Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp
85 90 95
Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe
100 105 110
Gly Asn Pro Ala Thr Gly Cys Arg Lys Gln Ala
115 120

<210> 29
<211> 113
<212> PRT
<213> *Streptococcus pyogenes*

<400> 29
Val Lys Arg Glu Lys Asp Phe Gln Ala Ile Phe Lys Asp Gly Lys Ser
1 5 10 15
Thr Ala Asn Arg Lys Phe Val Ile Tyr His Leu Asn Arg Gly Gln Asp
20 25 30
His Phe Arg Val Gly Ile Ser Val Gly Lys Lys Ile Gly Asn Ala Val
35 40 45
Thr Arg Asn Ala Val Lys Arg Lys Ile Arg His Val Ile Met Ala Leu
50 55 60
Gly His Gln Leu Lys Ser Glu Asp Phe Val Val Ile Ala Arg Lys Gly
65 70 75 80
Val Glu Ser Leu Glu Tyr Gln Glu Leu Gln Gln Asn Leu His His Val
85 90 95
Leu Lys Leu Ala Gln Leu Leu Glu Lys Gly Phe Glu Ser Glu Glu Lys
100 105 110
His

<210> 30
<211> 123
<212> PRT
<213> *Bordetella pertussis*

<400> 30
Met Pro Arg Ala Thr Leu Pro Ala Glu Ala Arg Leu His Arg Pro Ser
1 5 10 15
Glu Phe Ala Ala Ala Leu Lys Gly Arg Arg Leu Ala Arg Gly Ala Phe

20	25	30	
Phe Ile Val Ser Ala Ser Pro Cys Ala Pro Ala Asp Asp Gln Pro Ala			
35	40	45	
Arg Ala Arg Leu Gly Leu Val Ile Ala Lys Arg Phe Ala Ala Arg Ala			
50	55	60	
Val Thr Arg Asn Thr Leu Lys Arg Val Ile Arg Glu Ala Phe Arg Ala			
65	70	75	80
Arg Arg Leu Ala Leu Pro Ala Gln Asp Tyr Val Val Arg Leu His Ser			
85	90	95	
Lys Leu Thr Pro Ala Ser Leu Thr Ala Leu Lys Arg Ser Ala Arg Ala			
100	105	110	
Glu Val Asp Ala His Phe Thr Arg Ile Ala Arg			
115	120		

<210> 31
 <211> 137
 <212> PRT
 <213> Porphyromonas gingivalis

<400> 31	31		
Met Thr Ser Pro Pro Thr Phe Gly Leu Ser Lys Ser Glu Arg Leu Tyr			
1	5	10	15
Leu Arg Asp Glu Ile Asn Thr Val Phe Gly Glu Gly Lys Ala Phe Val			
20	25	30	
Val Tyr Pro Leu Arg Val Val Tyr Arg Leu Gly Ser Glu His Arg Val			
35	40	45	
Ala Tyr Ser Ser Met Leu Val Ser Val Ala Lys Lys Arg Phe Arg Arg			
50	55	60	
Ala Val Lys Arg Asn Arg Val Lys Arg Leu Val Arg Glu Ala Tyr Arg			
65	70	75	80
Leu Asn Lys His Leu Leu Asn Asp Val Leu Gln Glu Arg Gln Ile Tyr			
85	90	95	
Ala Thr Ile Ala Phe Met Val Val Ser Asp Glu Leu Pro Asp Phe Arg			
100	105	110	
Thr Val Glu Arg Ala Met Gln Lys Ser Leu Ile Arg Ile Ala Gly Asn			
115	120	125	
Val Pro Ser Ser Ala Leu Lys Asn Glu			
130	135		

<210> 32
 <211> 124
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 32	32		
Val Leu Lys Lys Asn Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Ala			
1	5	10	15
Ile Phe Lys Glu Gly Thr Ser Phe Ala Asn Arg Lys Phe Val Val Tyr			
20	25	30	
Gln Leu Glu Asn Gln Lys Asn Arg Phe Arg Val Gly Leu Ser Val Ser			
35	40	45	
Lys Lys Leu Gly Asn Ala Val Thr Arg Asn Gln Ile Lys Arg Arg Ile			
50	55	60	
Arg His Ile Ile Gln Asn Ala Lys Gly Ser Leu Val Glu Asp Val Asp			
65	70	75	80

Phe	Val	Val	Ile	Ala	Arg	Lys	Gly	Val	Glu	Thr	Leu	Gly	Tyr	Ala	Glu
								85			90			95	
Met	Glu	Lys	Asn	Leu	Leu	His	Val	Leu	Lys	Leu	Ser	Lys	Ile	Tyr	Arg
								100			105			110	
Glu	Gly	Asn	Gly	Ser	Glu	Lys	Glu	Thr	Lys	Val	Asp				
								115			120				

<210> 33
 <211> 114
 <212> PRT
 <213> Clostridium difficile

<400> 33																
Met	Asp	Phe	Asn	Arg	Thr	Lys	Gly	Leu	Lys	Asp	Ser	Asp	Phe	Arg		
1								5			10			15		
Lys	Val	Tyr	Lys	His	Gly	Lys	Ser	Phe	Ala	Asn	Lys	Tyr	Leu	Val	Ile	
								20			25			30		
Tyr	Ile	Leu	Lys	Asn	Lys	Ser	Asp	Tyr	Ser	Arg	Val	Gly	Ile	Ser	Val	
								35			40			45		
Ser	Lys	Lys	Val	Gly	Lys	Ala	Ile	Thr	Arg	Asn	Arg	Val	Arg	Arg	Leu	
								50			55			60		
Ile	Lys	Glu	Ala	Tyr	Arg	Leu	Asn	Ile	Asp	Glu	Lys	Ile	Lys	Pro	Gly	
								65			70			75		80
Tyr	Asp	Ile	Val	Phe	Ile	Ala	Arg	Val	Ser	Ser	Lys	Asp	Ala	Thr	Phe	
								85			90			95		
Lys	Asp	Ile	Asp	Lys	Ser	Ile	Lys	Asn	Leu	Val	Lys	Arg	Thr	Asp	Ile	
								100			105			110		
Ser	Ile															

<210> 34
 <211> 108
 <212> PRT
 <213> Camphylobacter jejuni

<400> 34																
Val	Lys	Asn	Phe	Asp	Lys	Phe	Ser	Thr	Asn	Glu	Glu	Phe	Ser	Ser	Val	
1								5			10			15		
Tyr	Lys	Val	Gly	Lys	Lys	Trp	His	Cys	Glu	Gly	Val	Ile	Ile	Phe	Tyr	
								20			25			30		
Leu	Asn	Ser	Tyr	Glu	Lys	Lys	Ile	Ala	Val	Val	Ala	Ser	Lys	Lys	Val	
								35			40			45		
Gly	Lys	Ala	Val	Val	Arg	Asn	Arg	Ser	Lys	Arg	Ile	Leu	Arg	Ala	Leu	
								50			55			60		
Phe	Ala	Lys	Phe	Glu	Arg	Tyr	Leu	Gln	Asp	Gly	Lys	Tyr	Ile	Phe	Val	
								65			70			75		80
Ala	Lys	Asn	Glu	Ile	Thr	Glu	Leu	Ser	Phe	Ser	Arg	Leu	Glu	Lys	Asn	
								85			90			95		
Leu	Lys	Trp	Gly	Leu	Lys	Lys	Leu	Glu	Cys	Phe	Lys					
								100			105					

<210> 35
 <211> 119
 <212> PRT

<213> Bacillus anthracis

<400> 35
Met Lys Lys Lys His Arg Ile Lys Lys Asn Asp Glu Phe Gln Thr Val
1 5 10 15
Phe Gln Lys Gly Lys Ser Asn Ala Asn Arg Gln Phe Val Val Tyr Gln
20 25 30
Leu Asp Lys Glu Glu Gln Pro Asn Phe Arg Ile Gly Leu Ser Val Ser
35 40 45
Lys Lys Ile Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Met Ile
50 55 60
Arg Gln Ser Ile Thr Glu Leu Lys Asp Glu Ile Asp Ser Gly Lys Asp
65 70 75 80
Phe Val Ile Ile Ala Arg Lys Pro Cys Ala Glu Met Thr Tyr Glu Glu
85 90 95
Leu Lys Lys Ser Leu Ile His Val Phe Lys Arg Ser Gly Met Lys Arg
100 105 110
Ile Lys Ser Ser Val Arg Lys
115

<210> 36

<211> 119

<212> PRT

<213> Mycobacterium avium

<400> 36
Val Leu Pro Ala Arg Asn Arg Met Thr Arg Ser Thr Glu Phe Asp Ala
1 5 10 15
Thr Val Lys His Gly Thr Arg Met Ala Gln Pro Asp Ile Val Val His
20 25 30
Leu Arg Arg Asp Ser Glu Pro Asp Asp Glu Ser Ala Gly Pro Arg Val
35 40 45
Gly Leu Val Val Gly Lys Ala Val Gly Thr Ala Val Gln Arg His Arg
50 55 60
Val Ala Arg Arg Leu Arg His Val Ala Arg Ala Leu Leu Gly Glu Leu
65 70 75 80
Glu Pro Ser Asp Arg Leu Val Ile Arg Ala Leu Pro Gly Ser Arg Thr
85 90 95
Ala Ser Ser Ala Arg Leu Ala Gln Glu Leu Gln Arg Cys Leu Arg Arg
100 105 110
Met Pro Ala Gly Thr Gly Pro
115

<210> 37

<211> 117

<212> PRT

<213> Staphylococcus aureus

<400> 37
Met Leu Leu Glu Lys Ala Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln
1 5 10 15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
20 25 30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
35 40 45

Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
50 55 60
Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
65 70 75 80
Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
85 90 95
Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
100 105 110
Asn Lys Lys Ile Lys
115

<210> 38
<211> 117
<212> PRT
<213> *Staphylococcus aureus*

<400> 38
Met Leu Leu Glu Lys Ala Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln
1 5 10 15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
20 25 30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
35 40 45
Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
50 55 60
Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
65 70 75 80
Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
85 90 95
Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
100 105 110
Asn Lys Lys Ile Lys
115

<210> 39
<211> 46
<212> PRT
<213> *Escherichia coli*

<400> 39
Leu Arg Leu Leu Thr Pro Ser Gln Phe Thr Arg Ile Gly Leu Thr Val
1 5 10 15
Ala Lys Lys Asn Val Arg Arg Ala His Glu Arg Asn Arg Ile Lys Arg
20 25 30
Leu Thr Arg Glu Leu Asp Phe Val Val Leu Ser Glu Ala Leu
35 40 45

<210> 40
<211> 46
<212> PRT
<213> *Proteus mirabilis*

<400> 40
Leu Arg Leu Leu Thr Pro Lys His Phe Asn Arg Ile Gly Leu Thr Ile

1	5	10	15											
Ala	Lys	Asn	Val	Lys	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg
20	25	30												
Leu	Ala	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Thr	Glu	Val	Leu	
35	40	45												

<210> 41
<211> 46
<212> PRT
<213> Haemophilus influenzae

1	5	10	15												
Leu	Arg	Leu	Leu	Thr	Pro	Ile	Gln	Phe	Lys	Arg	Leu	Gly	Leu	Thr	Val
20	25	30													
Ala	Lys	Lys	His	Leu	Lys	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg
35	40	45													

<210> 42
<211> 46
<212> PRT
<213> Pseudomonas putida

1	5	10	15												
Lys	Arg	Leu	Leu	Thr	Pro	Arg	His	Phe	Lys	Arg	Leu	Gly	Leu	Val	Ile
20	25	30													
Gly	Lys	Lys	Ser	Val	Lys	Leu	Ala	Val	Gln	Arg	Asn	Arg	Leu	Lys	Arg
35	40	45													

<210> 43
<211> 46
<212> PRT
<213> Buchnera aphidicola

1	5	10	15												
Ser	Lys	Leu	Leu	Lys	Ser	Thr	Asn	Phe	Gln	Arg	Leu	Gly	Leu	Ser	Ile
20	25	30													
Ser	Arg	Lys	Asn	Ile	Lys	His	Ala	Tyr	Arg	Arg	Asn	Lys	Ile	Lys	Arg
35	40	45													

<210> 44
<211> 46
<212> PRT
<213> Salmonella typhi

<220>
<221> VARIANT
<222> 31

<223> Xaa = Any Amino Acid

<400> 44
Leu Arg Leu Leu Thr Pro Ala His Phe Thr Arg Ile Gly Leu Thr Val
1 5 10 15
Ala Lys Lys Asn Val Arg Arg Ala His Glu Arg Xaa Arg Ile Lys Arg
20 25 30
Leu Thr Arg Glu Leu Asp Phe Val Val Leu Ser Glu Ala Leu
35 40 45

<210> 45
<211> 46
<212> PRT
<213> Yersinia pestis

<400> 45
Leu Arg Leu Leu Thr Pro Ser His Phe Thr Arg Ile Gly Leu Thr Val
1 5 10 15
Ala Lys Lys His Val Lys Arg Ala His Glu Arg Asn Arg Ile Lys Arg
20 25 30
Leu Thr Arg Glu Leu Asp Phe Val Val Leu Thr Glu Ala Leu
35 40 45

<210> 46
<211> 46
<212> PRT
<213> Klebsiella pneumoniae

<400> 46
Leu Arg Leu Leu Thr Pro Ser His Phe Thr Arg Ile Gly Leu Thr Val
1 5 10 15
Ala Lys Lys Asn Val Lys Arg Ala His Glu Arg Asn Arg Ile Lys Arg
20 25 30
Leu Thr Arg Glu Leu Asp Phe Val Val Leu Ser Glu Ala Leu
35 40 45

<210> 47
<211> 44
<212> PRT
<213> Salmonella paratyphi

<400> 47
Ile Arg Leu Pro Ala Thr Ser Thr Arg Ile Gly Leu Thr Val Ala Lys
1 5 10 15
Lys Asn Val Arg Arg Ala His Glu Arg Asn Arg Ile Lys Arg Leu Thr
20 25 30
Arg Glu Leu Asp Phe Val Val Leu Ser Glu Ala Leu
35 40

<210> 48
<211> 46
<212> PRT
<213> Vibrio cholerae

<400> 48
Leu Arg Leu Leu Thr Pro Glu His Tyr Gln Arg Leu Gly Leu Ala Val
1 5 10 15
Pro Lys Lys Gln Ile Lys Thr Ala Val Gly Arg Asn Arg Phe Lys Arg
20 25 30
Ile Cys Arg Glu Leu Asp Phe Val Val Leu Phe Asn Leu Leu
35 40 45

<210> 49
<211> 46
<212> PRT
<213> *Pseudomonas aeruginosa*

<400> 49
Lys Arg Leu Leu Thr Ala Arg Gln Phe Ser Arg Leu Gly Leu Val Ile
1 5 10 15
Gly Lys Lys Asn Val Lys Leu Ala Val Gln Arg Asn Arg Leu Lys Arg
20 25 30
Leu Ile Arg Glu Leu Asp Ile Val Val Leu His Gln Gln Phe
35 40 45

<210> 50
<211> 46
<212> PRT
<213> *Shewanella putrefaciens*

<400> 50
Leu Arg Leu Leu Thr Pro Ala Gln Phe Lys Arg Leu Gly Leu Thr Val
1 5 10 15
Ala Lys Arg Tyr Val Lys Arg Ala Asn Gln Arg Asn Arg Ile Lys Arg
20 25 30
Val Ile Arg Asp Ile Asp Ile Val Val Leu Asn Lys Leu Ile
35 40 45

<210> 51
<211> 46
<212> PRT
<213> *Coxiella burnetii*

<400> 51
Trp Arg Ile Arg Thr Thr Ala Glu Phe Arg Arg Leu Gly Val Val Ala
1 5 10 15
Ser Lys Arg Asn Val Arg Lys Ala Val Trp Arg Asn Arg Val Arg Arg
20 25 30
Val Val Lys Glu Leu Asp Ile Val Val Leu Tyr Glu Cys Ile
35 40 45

<210> 52
<211> 46
<212> PRT
<213> *Rickettsia prowazekii*

<400> 52
Thr Ser Leu Lys Asn Gln Lys Glu Phe Glu Leu Gly Ile Lys Val Ser
1 5 10 15
Arg Lys Leu Asn Lys Lys Ala Val Val Arg Asn Lys Ile Lys Arg Arg
20 25 30
Ile Arg His Ser Asn Ala Ile Ile Ile Leu Gln Tyr Glu Leu
35 40 45

<210> 53
<211> 51
<212> PRT
<213> Caulobacter crescentus

<400> 53
Glu Arg Leu Arg Lys Arg Pro Asp Phe Leu Arg Val Gly Phe Thr Ala
1 5 10 15
Thr Lys Lys Ile Gly Gly Ala Val Glu Arg Asn Arg Ala Lys Arg Arg
20 25 30
Leu Arg Glu Pro Leu His Asp Tyr Val Phe Leu Leu Asp Asp Val Lys
35 40 45
Thr Ala Leu
50

<210> 54
<211> 50
<212> PRT
<213> Helicobacter pylori 26695

<400> 54
Asp Ser Leu Lys Asn Lys Ser Glu Phe Asp Lys Leu Gly Leu Ser Val
1 5 10 15
Ser Lys Lys Val Gly Asn Ala Val Lys Arg Asn Leu Ile Lys Arg Arg
20 25 30
Leu Arg Ser Cys Gln Ala Leu Val Phe Leu Glu Lys His Phe Leu Glu
35 40 45
Met Leu
50

<210> 55
<211> 50
<212> PRT
<213> Helicobacter pylori J99

<400> 55
Asp Ser Leu Lys Asn Lys Ser Glu Phe Asp Lys Leu Gly Leu Ser Val
1 5 10 15
Ser Lys Lys Val Gly Asn Ala Val Lys Arg Asn Leu Ile Lys Arg Arg
20 25 30
Leu Arg Ser Cys Gln Ala Leu Val Phe Leu Glu Lys His Phe Leu Glu
35 40 45
Met Leu
50

<210> 56
<211> 50
<212> PRT
<213> *Camphylobacter jejuni*

<400> 56
Asp Lys Phe Ser Thr Asn Glu Glu Phe Ser Lys Ile Ala Val Val Ala
1 5 10 15
Ser Lys Lys Val Gly Lys Ala Val Val Arg Asn Arg Ser Lys Arg Ile
20 25 30
Leu Arg Ala Leu Gln Lys Tyr Ile Phe Leu Glu Lys Asn Leu Lys Trp
35 40 45
Gly Leu
50

<210> 57
<211> 46
<212> PRT
<213> *Neisseria gonorrhoeae*

<400> 57
Tyr Arg Leu Leu Lys Thr Asp Asp Phe Ser Arg Ile Gly Leu Val Val
1 5 10 15
Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg Asn Tyr Met Lys Arg
20 25 30
Val Ile Arg Asp Leu Asp Phe Val Val Ala Arg Ala Glu Leu
35 40 45

<210> 58
<211> 46
<212> PRT
<213> *Neisseria meningitidis*

<400> 58
Tyr Arg Leu Leu Lys Thr Asp Asp Phe Ser Arg Ile Gly Leu Val Val
1 5 10 15
Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg Asn Tyr Met Lys Arg
20 25 30
Val Ile Arg Asp Leu Asp Phe Val Val Ala Arg Ala Glu Leu
35 40 45

<210> 59
<211> 50
<212> PRT
<213> *Bordetella pertussis*

<400> 59
Ala Arg Leu His Arg Pro Ser Glu Phe Ala Arg Leu Gly Leu Val Ile
1 5 10 15
Ala Lys Arg Phe Ala Ala Arg Ala Val Thr Arg Asn Thr Leu Lys Arg
20 25 30
Val Ile Arg Glu Leu Asp Tyr Val Val Leu Lys Arg Ser Ala Arg Ala
35 40 45
Glu Val

<210> 60
 <211> 45
 <212> PRT
 <213> Thiobacillus ferrooxidans

<400> 60
 Asp Arg Leu Arg Gln Lys Val Ala Ile Gln Arg Leu Gly Leu Ala Val
 1 5 10 15
 Ser Arg Lys Val Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Arg
 20 25 30
 Leu Arg Glu Thr Asp Val Leu Val Met Gly Ala Tyr Leu
 35 40 45

<210> 61
 <211> 46
 <212> PRT
 <213> Streptomyces bikiniensis

<400> 61
 Asn Arg Leu Arg Arg Glu Asp Phe Ala Arg Ala Gly Phe Val Val
 1 5 10 15
 Ser Lys Ala Val Gly Gly Ala Val Val Arg Asn Gln Val Lys Arg Arg
 20 25 30
 Leu Arg His Leu Pro Leu Val Val Val Leu Ala Arg Asp Leu
 35 40 45

<210> 62
 <211> 46
 <212> PRT
 <213> Streptomyces coelicolor

<400> 62
 Asn Arg Leu Arg Arg Glu Asp Phe Ala Arg Ala Gly Phe Val Val
 1 5 10 15
 Ser Lys Ala Val Gly Val Ala Val Val Arg Asn Lys Val Lys Arg Arg
 20 25 30
 Leu Arg His Leu Pro Leu Val Val Val Leu Ala Arg Asp Leu
 35 40 45

<210> 63
 <211> 51
 <212> PRT
 <213> Micrococcus luteus

<400> 63
 Arg Arg Val Arg Thr Pro Ala Glu Phe Arg Arg Ala Gly Phe Val Val
 1 5 10 15
 Ser Lys Ala Val Gly Asn Ala Val Thr Arg Asn Arg Val Lys Arg Arg
 20 25 30
 Leu Arg Ala Leu Pro Val Leu Val Gln Val Leu Arg Arg Glu Thr Val
 35 40 45

Gly Ala Leu
50

<210> 64
<211> 47
<212> PRT
<213> *Mycobacterium tuberculosis*

<400> 64
Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Arg Val Gly Leu Ile Ile
1 5 10 15
Ala Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg
20 25 30
Leu Arg His Leu His Asp His Val Val Ile Leu Glu Gln Gln Leu
35 40 45

<210> 65
<211> 47
<212> PRT
<213> *Mycobacterium leprae*

<400> 65
Asn Arg Met Arg Arg Ser Ser Glu Phe Asp His Val Gly Leu Ile Ile
1 5 10 15
Ala Lys Thr Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg
20 25 30
Leu Arg His Leu Gly Asp Gln Val Val Ile Leu Ala Gln Gln Leu
35 40 45

<210> 66
<211> 47
<212> PRT
<213> *Mycobacterium bovis*

<400> 66
Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Arg Val Gly Leu Ile Ile
1 5 10 15
Ala Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg
20 25 30
Leu Arg His Leu His Asp His Val Val Ile Leu Glu Gln Gln Leu
35 40 45

<210> 67
<211> 47
<212> PRT
<213> *Mycobacterium avium*

<400> 67
Asn Arg Met Thr Arg Ser Thr Glu Phe Asp Arg Val Gly Leu Val Val
1 5 10 15
Gly Lys Ala Val Gly Thr Ala Val Gln Arg His Arg Val Ala Arg Arg
20 25 30
Leu Arg His Leu Glu Asp Arg Leu Val Ile Leu Ala Gln Glu Leu

35

40

45

<210> 68
<211> 48
<212> PRT
<213> *Corynebacterium diphtheriae*

<400> 68
His Lys Leu Ser Asn Ser Glu Gln Phe Arg Arg Phe Gly Leu Val Val
1 5 10 15
Ser Lys Ala Val Gly Asn Ala Val Thr Arg His Arg Val Ser Arg Gln
20 25 30
Leu Arg His Phe His Val Val Leu Arg Ala Asp Val Gln Ala Ala Leu
35 40 45

<210> 69
<211> 45
<212> PRT
<213> *Thermotoga maritima*

<400> 69
Glu Arg Leu Arg Leu Arg Arg Asp Phe Leu Arg Leu Gly Ile Val Val
1 5 10 15
Lys Arg Lys Phe Gly Lys Ala Thr Arg Arg Asn Lys Leu Lys Arg Trp
20 25 30
Val Arg Glu Ile Asp Ile Val Val Val Arg Glu Lys Leu
35 40 45

<210> 70
<211> 52
<212> PRT
<213> *Porphyromonas gingivalis*

<400> 70
Glu Arg Leu Tyr Leu Arg Asp Glu Ile Asn Thr Val Phe Ser Met Leu
1 5 10 15
Val Ser Val Ala Lys Lys Arg Phe Arg Arg Ala Val Lys Arg Asn Arg
20 25 30
Val Arg Arg Leu Val Arg Glu Leu Asp Val Leu Leu Pro Asp Phe Arg
35 40 45
Thr Val Glu Arg
50

<210> 71
<211> 49
<212> PRT
<213> *Deinococcus radiodurans*

<400> 71
Leu Arg Gly Glu Arg Glu Phe Arg Arg Ile Gly Leu Val Val Ser Lys
1 5 10 15
Lys Thr Leu Lys His Ala Val Lys Arg Asn Arg Ala Arg Arg Arg Val
20 25 30

Arg Glu Leu Leu Arg Ala Ile Leu Leu Ala Gln Ala Leu Gln Arg Gly
35 40 45
Ala

<210> 72
<211> 49
<212> PRT
<213> Chlorobium tepidum

<400> 72
Ala Arg Leu Lys Gly Gly Phe Leu Arg Val Leu Phe Thr Val Gly Lys
1 5 10 15
Lys Leu Val Pro Arg Ala Val Asp Arg Asn Arg Ile Lys Arg Leu Met
20 25 30
Arg Glu Leu Thr Asp His Gln Val Leu Glu Arg Phe Arg Ala Ile Arg
35 40 45
His

<210> 73
<211> 46
<212> PRT
<213> Bacillus subtilis

<400> 73
Asn Arg Leu Lys Lys Asn Glu Asp Phe Gln Arg Val Gly Leu Ser Val
1 5 10 15
Ser Lys Lys Ile Gly Asn Ala Val Met Arg Asn Arg Ile Lys Arg Leu
20 25 30
Ile Arg Gln Leu Lys Asp Tyr Ile Ile Thr Lys Lys Ser Leu
35 40 45

<210> 74
<211> 45
<212> PRT
<213> Bacillus halodurans

<400> 74
His Arg Ile Lys Arg Ser Asp Glu Phe Ser Arg Val Leu Ser Val Ser
1 5 10 15
Lys Lys Ile Gly Asn Ala Val Thr Arg Asn Arg Val Lys Arg Leu Ile
20 25 30
Arg Thr Ile Ser Asp Tyr Val Ile Val Lys Gly Ser Leu
35 40 45

<210> 75
<211> 46
<212> PRT
<213> Bacillus anthracis

<400> 75
His Arg Ile Lys Lys Asn Asp Glu Phe Gln Arg Ile Gly Leu Ser Val

1	5	10	15
Ser Lys Lys Ile Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Met			
20	25	30	
Ile Arg Gln Ile Asp Asp Phe Val Ile Leu Lys Lys Ser Leu			
35	40	45	

<210> 76
<211> 46
<212> PRT
<213> *Mycoplasma capricolum*

1	5	10	15
Arg Val Ile Lys Lys Asn Phe Glu Phe Gln Lys Tyr Gly Ile Ser Val			
20	25	30	
Gly Lys Lys Ile Gly Asn Ala Val Ile Arg Asn Lys Val Lys Arg Gln			
35	40	45	

<210> 77
<211> 47
<212> PRT
<213> *Mycoplasma pneumoniae*

1	5	10	15
His His Leu Arg Asp Arg Lys Val Phe Ala Arg Ala Ala Val Ser Ile			
20	25	30	
Ser Lys Thr Lys Tyr Lys Leu Ala Val Glu Arg Asn Leu Ile Arg Arg			
35	40	45	

<210> 78
<211> 47
<212> PRT
<213> *Mycoplasma genitalium*

1	5	10	15
His Ser Leu Arg Glu Arg Lys Val Phe Thr Arg Val Ala Ile Ser Ile			
20	25	30	
Ala Lys Thr Lys Tyr Lys Leu Ala Val Gln Arg Asn Leu Ile Lys Arg			
35	40	45	

<210> 79
<211> 44
<212> PRT
<213> *Streptococcus pyogenes*

1	5	10	15
Val Lys Arg Glu Lys Asp Phe Gln Arg Val Gly Ile Ser Val Gly Lys			

Lys Ile Gly Asn Ala Val Thr Arg Asn Ala Val Lys Arg Lys Ile Arg
20 25 30
His Leu Lys Asp Phe Val Val Leu Gln Gln Asn Leu
35 40

<210> 80
<211> 46
<212> PRT
<213> Streptococcus mutans

<400> 80
Tyr Arg Val Lys Ser Asp Lys Asp Phe Gln Arg Val Gly Leu Ser Val
1 5 10 15
Gly Lys Arg Leu Gly Asn Ala Val Val Arg Asn Ala Ile Lys Arg Lys
20 25 30
Leu Arg His Leu Gly Asp Phe Val Val Met Lys Lys Asn Leu
35 40 45

<210> 81
<211> 46
<212> PRT
<213> Streptococcus pneumoniae

<400> 81
Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Arg Val Gly Leu Ser Val
1 5 10 15
Ser Lys Lys Leu Gly Asn Ala Val Thr Arg Asn Gln Ile Lys Arg Arg
20 25 30
Ile Arg His Leu Val Asp Phe Val Val Met Glu Lys Asn Leu
35 40 45

<210> 82
<211> 46
<212> PRT
<213> Staphylococcus aureus NCTC

<400> 82
Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln Arg Leu Gly Ile Ser Val
1 5 10 15
Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg Ala
20 25 30
Ile Arg Glu Ile Leu Asp Ile Ile Val Ile Gln Asn Ser Leu
35 40 45

<210> 83
<211> 46
<212> PRT
<213> Staphylococcus aureus COL

<400> 83
Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln Arg Leu Gly Ile Ser Val
1 5 10 15
Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg Ala

20	25	30
Ile Arg Glu Ile Leu Asp Ile Ile Val Ile Gln Asn Ser Leu		
35	40	45

<210> 84
<211> 46
<212> PRT
<213> Clostridium difficile

<400> 84
Lys Gly Leu Lys Lys Asp Ser Asp Phe Arg Arg Val Gly Ile Ser Val
1 5 10 15
Ser Lys Lys Val Gly Lys Ala Ile Thr Arg Asn Arg Val Arg Arg Leu
20 25 30
Ile Lys Glu Lys Ile Lys Asp Ile Val Phe Ile Lys Asn Leu
35 40 45

<210> 85
<211> 47
<212> PRT
<213> Synechocystis PCC6803

<400> 85
Leu Arg Leu Lys His Trp Gln Asp Phe Gln Arg Phe Gly Ile Thr Val
1 5 10 15
Ser Gln Lys Val Ser Lys Lys Ala Thr Val Arg Asn Arg Leu Lys Arg
20 25 30
Gln Ile Arg Ala Ile Lys Asp Val Val Ile Phe Leu Arg Glu Leu
35 40 45

<210> 86
<211> 47
<212> PRT
<213> Pseudanabaena PCC6903

<400> 86
Asn Arg Leu Arg Arg Glu Asp Phe Ala Arg Ile Gly Ile Val Val
1 5 10 15
Ser Lys Lys Val Ser Lys Leu Ala Val Thr Arg Asn Arg Phe Lys Arg
20 25 30
Gln Leu Arg Ala Leu Lys Gln Ile Val Val Leu Gly Asp Asp Leu
35 40 45

<210> 87
<211> 46
<212> PRT
<213> Borrelia burgdorferi

<400> 87
Ile Ser Leu Lys Ser Lys Ile Glu Ile Gln Arg Ile Leu Val Thr Phe
1 5 10 15
Ser Lys Gly Phe Arg Gly Ser Val Lys Arg Asn Arg Ile Arg Arg Leu
20 25 30

Phe Lys Glu Leu Glu Asp Ile Ile Phe Ile Glu Ser Leu Met
35 40 45

<210> 88
<211> 46
<212> PRT
<213> *Treponema pallidum*

<400> 88
Glu Arg Leu Arg Gly Ser Cys Arg Val Arg Arg Phe Leu Ala Thr Phe
1 5 10 15
Arg Arg Gly Tyr Gly Lys Ala Val Ala Arg Asn Arg Ala Arg Arg Leu
20 25 30
Ser Lys Glu Leu Val Asp Leu Val Leu Leu Leu Cys Val Leu
35 40 45

<210> 89
<211> 49
<212> PRT
<213> *Chlamydia trachomatis*

<400> 89
Ala Arg Leu Leu Lys Arg Lys Gln Phe Val Lys Val Gly Ile Thr Val
1 5 10 15
Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg Phe Lys Arg Ile
20 25 30
Val Arg Glu Leu Gln Val Val Ile Leu Ser Glu Glu Leu Leu Gln Arg
35 40 45
Ile

<210> 90
<211> 49
<212> PRT
<213> *Chlamydia trachomatis MoPn*

<400> 90
Ala Arg Leu Leu Lys Arg Lys Gln Phe Val Lys Val Gly Val Thr Val
1 5 10 15
Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg Phe Lys Arg Ile
20 25 30
Val Arg Glu Leu Gln Val Val Val Leu Ser Ala Asp Leu Leu Lys His
35 40 45
Ile

<210> 91
<211> 49
<212> PRT
<213> *Chlamydia pneumoniae*

<400> 91
Ser Arg Val Leu Lys Arg Lys Gln Phe Leu Arg Met Gly Ile Thr Val

1	5	10	15
Ser Lys Lys Phe Gly Lys Ala His Glu Arg Asn Ser Phe Lys Arg Val			
20	25	30	
Val Arg Glu Leu Gln Ile Val Val Leu Leu Gln Asp Phe Ile Asn Gln			
35	40	45	

Ile

<210> 92
 <211> 118
 <212> PRT
 <213> *Salmonella typhi*

<220>
 <221> VARIANT
 <222> 63
 <223> Xaa = any amino acid

<400> 92
 Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ala
 1 5 10 15
 His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
 20 25 30
 Ile Thr Xaa Leu Gly Arg Leu Asn Ser Leu Gly His Pro Arg Ile Gly
 35 40 45
 Leu Thr Val Ala Lys Lys Asn Val Arg Arg Ala His Glu Arg Xaa Arg
 50 55 60
 Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu Arg Gln His Glu Leu
 65 70 75 80
 Pro Ala Met Asp Phe Val Val Ala Lys Lys Gly Val Ala Asp Leu
 85 90 95
 Asp Asn Arg Ala Leu Ser Glu Ala Leu Glu Lys Leu Trp Arg Arg His
 100 105 110
 Cys Arg Leu Ala Arg Gly
 115

<210> 93
 <211> 119
 <212> PRT
 <213> *Yersinia pestis*

<400> 93
 Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ser
 1 5 10 15
 His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
 20 25 30
 Ile Thr Ile Leu Gly Arg Leu Asn Glu Leu Gly His Pro Arg Ile Gly
 35 40 45
 Leu Thr Val Ala Lys Lys His Val Lys Arg Ala His Glu Arg Asn Arg
 50 55 60
 Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu His Gln His Ala Leu
 65 70 75 80
 Pro Ser Met Asp Phe Val Val Leu Val Lys Lys Gly Val Ala Asp Leu
 85 90 95
 Asp Asn Arg Ala Leu Thr Glu Ala Leu Glu Lys Leu Trp Arg Arg His

100 105 110
Cys Arg Gln Ala Pro Ala Ser
115

<210> 94
<211> 115
<212> PRT
<213> Mycobacterium bovis

<400> 94
Val Leu Arg Ala Arg Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Thr
1 5 10 15
Thr Val Lys His Gly Met Arg Thr Val Arg Ser Asp Met Val Val Tyr
20 25 30
Trp Trp Arg Gly Ser Gly Gly Pro Arg Val Gly Leu Ile Ile Ala
35 40 45
Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg Leu
50 55 60
Arg His Val Ala Gly Ser Ile Val Lys Glu Leu His Pro Ser Asp His
65 70 75 80
Val Val Ile Arg Ala Leu Pro Ser Ser Arg His Val Ser Ser Ala Arg
85 90 95
Leu Glu Gln Gln Leu Arg Cys Gly Leu Arg Arg Ala Val Glu Leu Ala
100 105 110
Gly Ser Asp
115

<210> 95
<211> 136
<212> PRT
<213> H. influenza

<400> 95
Met Leu Lys Val Val Lys Val Tyr Leu His Asn His Asn Ser Gln Phe
1 5 10 15
Leu Val Val Lys Leu Asn Phe Ser Arg Glu Leu Arg Leu Leu Thr Pro
20 25 30
Ile Gln Phe Lys Asn Val Phe Glu Gln Pro Phe Arg Ala Ser Thr Pro
35 40 45
Glu Ile Thr Ile Leu Ala Arg Lys Asn Asn Leu Glu His Pro Arg Leu
50 55 60
Gly Leu Thr Val Ala Lys Lys His Leu Lys Arg Ala His Glu Arg Asn
65 70 75 80
Arg Ile Lys Arg Leu Val Arg Glu Ser Phe Arg Leu Ser Gln His Arg
85 90 95
Leu Pro Ala Tyr Asp Phe Val Phe Val Ala Lys Asn Gly Ile Gly Lys
100 105 110
Leu Asp Asn Asn Thr Phe Ala Gln Ile Leu Glu Lys Leu Trp Gln Arg
115 120 125
His Ile Arg Leu Ala Gln Lys Ser
130 135

<210> 96
<211> 125

<212> PRT

<213> M. tuberculosis-2

<400> 96

Met Ile Ala Thr Pro Gly Leu Phe Ala Val Leu Arg Ala Arg Asn Arg
1 5 10 15
Met Arg Arg Ser Ala Asp Phe Glu Thr Thr Val Lys His Gly Met Arg
20 25 30
Thr Val Arg Ser Asp Met Val Val Tyr Trp Trp Arg Gly Ser Gly Gly
35 40 45
Gly Pro Arg Val Gly Leu Ile Ile Ala Lys Ser Val Gly Ser Ala Val
50 55 60
Glu Arg His Arg Val Ala Arg Arg Leu Arg His Val Ala Gly Ser Ile
65 70 75 80
Val Lys Glu Leu His Pro Ser Asp His Val Val Ile Arg Ala Leu Pro
85 90 95
Ser Ser Arg His Val Ser Ser Ala Arg Leu Glu Gln Gln Leu Arg Cys
100 105 110
Gly Leu Arg Arg Ala Val Glu Leu Ala Gly Ser Asp Arg
115 120 125

<210> 97

<211> 117

<212> PRT

<213> Staphylococcus aureus

<400> 97

Met Leu Leu Glu Lys Val Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gly
1 5 10 15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
20 25 30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
35 40 45
Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
50 55 60
Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
65 70 75 80
Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
85 90 95
Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
100 105 110
Asn Lys Lys Ile Lys
115

<210> 98

<211> 112

<212> PRT

<213> Staphylococcus pneumonia

<400> 98

Leu Lys Lys Asn Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Ala Ile
1 5 10 15
Phe Lys Glu Gly Thr Ser Phe Ala Asn Arg Lys Phe Val Val Tyr Gln
20 25 30
Leu Glu Asn Gln Lys Asn His Phe Arg Val Gly Leu Ser Val Ser Lys

35 40 45
Lys Leu Gly Asn Ala Val Thr Arg Asn Gln Ile Lys Arg Arg Ile Arg
50 55 60
His Ile Ile Gln Asn Ala Lys Gly Ser Leu Val Glu Asp Val Asp Phe
65 70 75 80
Val Val Ile Ala Arg Lys Gly Val Glu Thr Leu Gly Tyr Ala Glu Met
85 90 95
Glu Lys Asn Leu Leu His Val Leu Lys Leu Ser Lys Ile Tyr Arg Glu
100 105 110